5-2 Inequalities and Triangles

"if and only if"

Definition of Inequality-- a > b iff there is a positive number c, such that a = b + c

ex

$7 = 4 + 3$

$7 > 4$

$7 > 3$ def of ineq.

Properties

Comparison

Transitive

Addition/Subtraction

Multiplication/Division

Substitution

ex: $-3x < 9$

$x > -3$

Ex:

$LN = LM + MN$ (S.A.P)

$LN > LM$ → def of ineq.

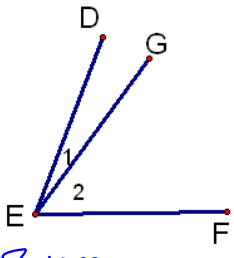
$LN > MN$ →

Ex:

$m\angle DEF = m\angle 1 + m\angle 2$

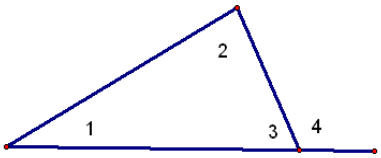
$m\angle DEF > m\angle 1$

$m\angle DEF > m\angle 2$



def of ineq.

Ex:



$m\angle 4 = m\angle 1 + m\angle 2$

$m\angle 4 > m\angle 1$

$m\angle 4 > m\angle 2$

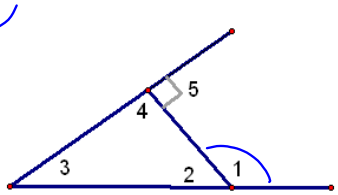
Thm. 5.8 Exterior Angle Inequality Theorem--The ext. angle of a triangle is greater than either of its corresponding remote interior angles

Which angle is the largest?

(Figure is not drawn to scale.)

$\angle 1$

$\angle 5$



$m\angle 1 > m\angle 3$ $m\angle 4$

$m\angle 5 > m\angle 2$ $m\angle 3$

$m\angle 1 > m\angle 5$

What angles measure less than angle 14? (Figure is not drawn to scale.)

$\angle 4$

$\angle 11$

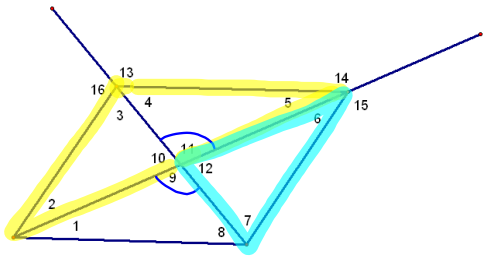
$\angle 3$

$\angle 2$

$\angle 9$

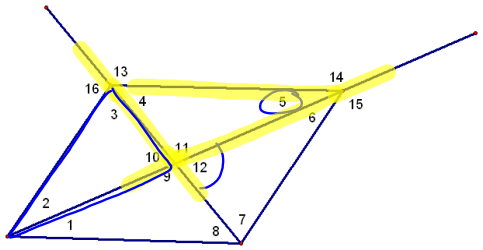
$\angle 7$

$\angle 6$



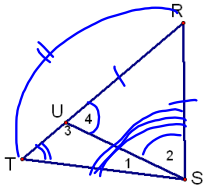
What angles measure greater than angle 5? (Figure is not drawn to scale.)

∠12
∠10
∠13
∠15
∠16



Given: △RST
RU = RS
RT > RS

Prove: m∠RST > m∠T



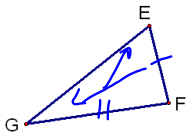
S.	R.
(1) ~	(1) Given
(2) m∠4 > m∠T	(2) Ext ∠ Ineq. thm
(3) ∠4 ≅ ∠2	(3) I△thm
(4) m∠4 = m∠2	(4) def of ≅
(5) m∠2 > m∠T	(5) Subst.
(6) m∠RST = m∠1 + m∠2	(6) A.A.P
(7) m∠RST > m∠2	(7) def of Ineq
(8) m∠RST > m∠T	(8) Transitive

Theorem 5.9--If one side of a triangle is longer than another side, then the angle opposite the longer side has a greater measure than the angle opposite the shorter side.

G: GF > EF

Concl:

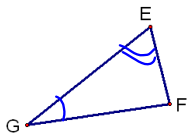
m∠E > m∠G



Theorem 5.10--If one angle of a triangle is larger than another angle, then the side opposite the larger angle has a greater measure than the side opposite the shorter angle.

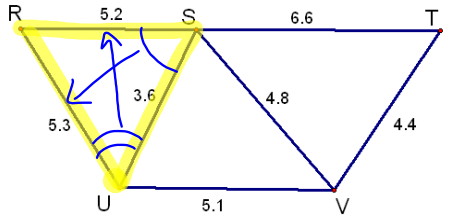
G: m∠E > m∠G

Concl: GF > EF



1. Which is greater, m∠RSU or m∠SUR?

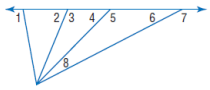
2. Which is greater, m∠TSV or m∠STV?



Hw
p252
17-35, 37-42

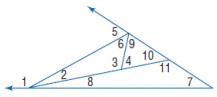
Determine which angle has the greatest measure.

17. ∠1, ∠2, ∠4
18. ∠2, ∠4, ∠6
19. ∠3, ∠5, ∠7
20. ∠1, ∠2, ∠6
21. ∠5, ∠7, ∠8
22. ∠2, ∠6, ∠8



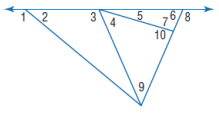
Use the Exterior Angle Inequality Theorem to list all angles that satisfy the stated condition.

23. all angles whose measures are less than $m\angle 5$
24. all angles whose measures are greater than $m\angle 6$
25. all angles whose measures are greater than $m\angle 10$



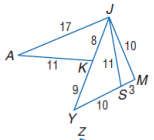
Use the Exterior Angle Inequality Theorem to list all angles that satisfy the stated condition.

26. all angles whose measures are less than $m\angle 1$
27. all angles whose measures are greater than $m\angle 9$
28. all angles whose measures are less than $m\angle 8$



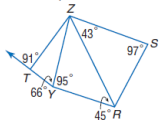
Determine the relationship between the measures of the given angles.

29. ∠KAJ, ∠AJK
30. ∠MJY, ∠JYM
31. ∠SMJ, ∠MJS
32. ∠AKJ, ∠JAK
33. ∠MYJ, ∠JMY
34. ∠JSY, ∠JYS



Determine the relationship between the lengths of the given sides.

37. $\overline{ZY}$, $\overline{YR}$
38. $\overline{SR}$, $\overline{ZS}$
39. $\overline{RZ}$, $\overline{SR}$
40. $\overline{ZY}$, $\overline{RZ}$
41. $\overline{TY}$, $\overline{ZY}$
42. $\overline{TY}$, $\overline{ZT}$



35. **Given:** $\overline{JM} \cong \overline{JL}$, $\overline{JL} \cong \overline{KL}$

Prove: $m\angle 1 > m\angle 2$